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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/361,652
Filing Date: July 27, 1999
Appellant(s): ZUKER ET AL.

Chuan Gao
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 14 May of 2007 appealing from the Office action mailed 13 July of 2006.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is substantially correct. The changes are as follows:

WITHDRAWN REJECTIONS

The following grounds of rejection are not presented for review on appeal because they have been withdrawn by the examiner. The rejection of claims 1, 6, 34, 35 and 61 to 67 under 35 U.S.C. §112, first paragraph, for lack of adequate written description has been reconsidered in view of Appellant's arguments and withdrawn.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

No evidence is relied upon by the examiner in the rejection of the claims under appeal.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1, 4 to 6, 8, 34, 35 and 61 to 67 are rejected under 35 U.S.C. § 101 because they are drawn to an invention with no apparent or disclosed **specific** and substantial credible utility in currently available form. The instant claims are drawn to an isolated nucleic acid encoding a taste cell specific G protein-coupled receptor identified in the instant specification as "GPCR-B3" and a method of producing the protein encoded thereby. The text on page 6 of the instant application states that a protein encoded by a nucleic acid of the claimed invention can be used in "a method for identifying a compound that modulates sensory signaling in sensory cells". This rejection is based upon the premise that a method of "identifying a compound that **modulates sensory signaling** in sensory cells" is not a specific utility and that additional experimentation is required before a practical utility for the claimed invention can be established.

The text on page 56 of the instant specification discloses that a cDNA encoding a protein of the instant invention was initially isolated from a cDNA library generated from taste papillae by subtracted cloning to select for taste cell specific cDNAs. The experimental evidence described on page 58 therein shows that a protein of the instant

invention is expressed specifically in taste cells. Figure 1 of the instant specification shows that the deduced amino acid sequence encoded by the claimed nucleic acid was identified as belonging to the G protein-coupled receptor family based upon the presence of predicted topological features that are definitive of this receptor protein family. Therefore, given the evidence of record at the time that the instant application was filed, one of ordinary skill would have concluded that a "GPCR-B3" protein of the instant invention is a g protein-coupled receptor that is expressed specifically in taste cells.

However, the text on page 2 of the instant specification states that "[m]ammals are believed to have five basic taste modalities: sweet, bitter, sour, salty and unami", "[e]xtensive psychophysical studies in humans have reported that different regions of the tongue display different gustatory preferences", and that "numerous physiological studies in animals have shown that taste receptor cells may selectively respond to different tastants". The text on page 3 states that "[s]weet, bitter, and unami transduction are believed to be mediated by G- protein-coupled receptor (GPCR) signaling pathways", "there are almost as many models of signaling pathways for sweet and bitter transduction as there are effector enzymes for GPCR cascades (e.g., G protein subunits", and that "little is known about the specific membrane receptors involved in taste transduction, or many of the individual intracellular signaling molecules activated by the individual taste transduction pathways". Therefore, the "GPCR-B3" protein of the instant invention does not correspond to a known protein having an established role in the perception of taste.

The text bridging pages 8 and 9 of the specification states that compounds that modulate the activity of a "GPCR-B3" protein of the instant invention can "be used in the food and pharmaceutical industries to customize taste". Because a compound that induces a sweet taste would not be considered interchangeable with a compound that induces a bitter or unami taste, one would need to know which sensation is induced by the activation of "GPCR-B3" before one could employ an activator of that protein to produce a customized taste. The instant specification leaves it to the artisan to engage in the experimentation required to establish a nexus between "GPCR-B3" and a specific sensory signal such as the perception of sweet, bitter or unami taste. Simply employing a "GPCR-B3" protein of the instant invention in the identification of activators or inhibitors thereof without knowing the physiological consequence of activating or inhibiting "GPCR-B3" is to employ that protein as the object of further research. This further characterization is part of the act of invention and until it has been undertaken Applicant's claimed invention is incomplete. Whereas one could readily employ a putative receptor protein of the instant invention in an assay to identify ligands thereto the information obtained thereby would be of little use until one discovers the identity of those physiological processes moderated by the interaction of that ligand with that putative receptor. One could not employ that protein in the general identification of compounds that are tasteless because there is no evidence that "GPCR-B3" is involved in sweet, bitter, sour, salty **and** unami perception. Therefore, one must establish which, if any, of the sensations of sweet, bitter, sour, salty and/or unami are induced by the

activation of "GPCR-B3" before that protein can be employed in the practical utility of identifying compounds that have a specific effect upon taste perception.

Because the instant specification has failed to credibly identify a physiological process which has been shown to be influenced by the activation or inhibition of a putative receptor protein of the instant invention an artisan would have no way of predicting what effects the administration of that ligand to an organism would have. If one can not predict the effects that the administration of a ligand of the putative receptor of the instant invention is going to have on an organism then it is unclear as to what practical benefit is derived by the public from the identification of that ligand.

The instant situation is directly analogous to that which was addressed in *Brenner v. Manson*, 148 U.S.P.Q. 689 (Sus. Ct, 1966), in which a novel compound which was structurally analogous to other compounds which were known to possess anti-cancer activity was alleged to be potentially useful as an anti-tumor agent in the absence of evidence supporting this utility. The court expressed the opinion that all chemical compounds are "useful" to the chemical arts when this term is given its broadest interpretation. However, the court held that this broad interpretation was not the intended definition of "useful" as it appears in 35 U.S.C. § 101, which requires that an invention must have either an immediately obvious or fully disclosed "real world" utility. The court held that:

> "The basic quid pro quo contemplated by the Constitution and the Congress for granting a patent monopoly is the benefit derived by the public from an invention with substantial utility", " [u]nless and until a process is refined and developed to this point-where specific benefit exists in currently available form-there is insufficient justification for permitting an applicant to engross what may prove to be a broad field", and "a patent is not a hunting

> license", " [i]t is not a reward for the search, but compensation for its successful conclusion."

The instant claims are drawn to a nucleic acid encoding a protein of as yet undetermined function or biological significance, and the protein encoded thereby. There is absolutely no evidence of record or any line of reasoning that would support a conclusion that a protein of the instant invention is involved in taste perception in general. Until some actual and specific significance can be attributed to the protein identified in the specification as "GPCR-B3", or the gene encoding it, the instant invention is incomplete. The protein encoded by a DNA of the instant invention is a compound known to be structurally analogous to proteins which are known in the art as G protein-coupled receptors. In the absence of a knowledge of the natural ligands or biological significance of this protein, there is no immediately obvious patentable use for it. To employ a protein of the instant invention in the identification of substances which inhibit or induce its activity without knowing the significance of that inhibition or activation is clearly to use it as the object of further research which has been determined by the courts to be a utility which, alone, does not support patentability. The decision in Brenner held that an invention must have a specific and substantial utility "in currently available form", which precludes the need for further research, if that research is needed to establish a utility for the claimed invention (*Brenner v. Manson*, 148 U.S.P.Q. 689 (Sus. Ct, 1966)). Since the instant specification does not disclose a specific "real world" use for "GPCR-B3" then the claimed invention is incomplete and, therefore, does not meet the requirements of 35 U.S.C. § 101 as being useful in its currently available form.

The text in the third paragraph on page 9 and in section VIII of page 53 of the specification asserts that a protein of the instant invention can be employed as a paternity or forensic marker. The employment of a protein of the instant invention, or a nucleic acid encoding that protein, as a tissue specific marker is neither a substantial nor a specific utility. All human proteins can invariably be classified into two categories, those which are expressed in a tissue or developmentally specific manner and those which are expressed ubiquitously. It can be alleged that any protein that is expressed in a tissue specific manner can be employed to detect the tissue in which it is expressed in a sample. Alternately, a human protein that is expressed ubiquitously can be employed to detect the presence of any human tissue in a sample. Such utilities are analogous to the assertion that a particular protein can be employed as a molecular weight marker, which is neither a specific or substantial utility.

One could just as readily argue that any purified compound having a known structure or a fixed measurable property could be employed as an analytical standard in such processes as nuclear magnetic resonance (NMR), infrared spectroscopy (IR), and mass spectroscopy as well as in polyacrylamide gel electrophoresis (PAGE), high performance liquid chromatography (HPLC) and gas chromatography. None of these processes could be practiced without either calibration standards having known molecular structures or, at least, a range of molecular weight markers having known molecular weights. One could further extrapolate upon this premise by asserting that any item having a fixed measurable parameter can be employed to calibrate any machine or process which measures that parameter. For example, any item having a constant mass within an acceptable range can be employed to calibrate a produce scale in a grocery store. The calibration of produce scales is certainly an important function since most states require produce scales to be calibrated and certified. Therefore, to accept the assertion that a protein of the instant invention is useful as a marker would be comparable to conceding that any object of fixed mass has *prima facie* utility as a weight standard, irrespective of any other properties possessed by that object. It was just such applications that the court appeared to be referring to when it expressed the opinion that all chemical compounds are "useful" to the chemical arts when this term is given its broadest interpretation (*Brenner v. Manson*, 148 U.S.P.Q. 689 (Sus. Ct, 1966)). Because the steroid compound which was the subject of that decision had a known structure and molecular weight it could have readily been employed as a molecular standard at that time. Further, because that compound was a

hydrocarbon it certainly could have been employed in the well known process of combustion for purposes of lighting and/ or the generation of heat. The generation of heat by combustion of hydrocarbons certainly was and remains an important process. Irrespective of such obvious utilities, the court still held that the compound produced by the process at issue in *Brenner v. Manson* did not have a specific and substantial utility.

To grant Applicant a patent encompassing an isolated polynucleotide encoding a naturally occurring human protein of as yet undetermined biological significance would be to grant Applicant a monopoly "the metes and bounds" of which "are not capable of precise delineation". That monopoly "may engross a vast, unknown, and perhaps unknowable area" and "confer power to block off whole areas of scientific development, without compensating benefit to the public" *(Brenner v. Manson, Ibid)*. To grant Applicant a patent on the claimed polynucleotide based solely upon an assertion that the protein encoded thereby can be employed as a tissue marker is clearly prohibited by this judicial precedent since the compensation to the public is not commensurate with the monopoly granted and would be no different than granting a patent on the process disputed in *Brenner v. Manson* on the premise that the steroid produced thereby was useful as an analytical standard or as a combustible fuel source.

With respect to the assertion that the claimed invention can be employed as a paternity marker, a nucleic acid of the instant invention is not useful in paternal analysis in currently available form, as alleged by Applicant, because it does not meet the criteria of a paternal marker. For a nucleic acid to be useful as a paternal marker, more than one detectable allelic variant for that gene must be known.

Claims 1, 4 to 6, 8, 34, 35 and 61 to 67 are rejected under 35 U.S.C. § 112, first paragraph, as failing to adequately teach how to use the instant invention for those reasons given above with regard to the rejection of these claims under 35 U.S.C. § 101.

(10) Response to Argument

In section 2 of their Brief on appeal, Appellant urges that the protein encoded by the claimed nucleic acid is a taste cell specific GPCR which "is a component of the taste signal transduction pathway and is capable of, via its interaction with a G-protein, mediating taste (such as sweet, bitter, unami, etc.) perception" and "that GPCR-B3 polypeptides or the encoding nucleic acids can be used, for example, as probes to identify taste cells, to generate taste topographic map, and to provide a screening method for compounds that can modulate taste signaling and are therefore useful in the food and pharmaceutical industries". There is no dispute with respect to the assertion that a protein of the instant invention is a taste-specific G protein-coupled receptor". However, as stated above, the utilization of that protein in the identification of compounds that "mediate" taste is not **specific** and its employment as a tissue marker is not a **substantial** utility for a naturally occurring human sensory protein.

The declaration by Charles Zuker under 37 C.F.R. 1.132 that was submitted on 16 September of 2002 has been considered but it has not been found persuasive simply because it adds nothing to the arguments of record. The assertion therein that a "GPCR-B3" protein of the instant invention is a functional G protein-coupled receptor which is expressed in a taste specific manner is not in dispute, nor is the assertion that it can be employed as a tissue marker.

Applicant urges that the Nelson et al. publication, (Nature 124:1-4, Feb. 2002) shows that a "GPCR-B3" protein of the instant invention, which is identified therein as T1R1, has been shown, subsequent to the filing of the instant application, to form a functional taste receptor when combined with another taste-specific G protein-coupled receptor identified by Nelson et al. as T1R3. All that Nelson et al. adds to the record is the fact that the "GPCR-B3" protein of the instant invention is inoperable as a taste receptor in the absence of the subsequently discovered T1R3 protein. This reference clearly shows that a substantial additional inventive contribution was required before a "GPCR-B3" protein of the instant invention could be employed in a practical utility.

For the purpose of clarification, it is noted that the only functional evidence presented in the instant specification is described in Figure 4 therein. That experiment shows that a chimeric receptor in which the entire ligand binding domain of "GPCR-B3" has been replaced by the entire ligand binding domain from a G protein-coupled glutamate receptor is activated by the administration of glutamate. Whereas the "GPC-B3" protein of the instant invention is presumed to be functional only because it is a naturally occurring protein, the instant specification fails to disclose those conditions in which the activation of unmodified "GPCR-B3" can be observed. It is further noted that M.P.E.P. 2138.05 states that "a probable utility does not establish a practical utility, which is established by actual testing or where the utility can be "foretold with certainty." Bindra v. Kelly , 206 USPQ 570, 575 (Bd. Pat. Inter. 1979) (Reduction to practice was not established for an intermediate useful in the preparation of a second intermediate with a known utility in the preparation of a pharmaceutical. The record established there

was a high degree of probability of a successful preparation because one skilled in the art may have been motivated, in the sense of 35 U.S.C. 103, to prepare the second intermediate from the first inter mediate. However, a strong probability of utility is not sufficient to establish practical utility.); Wu v. Jucker , 167 USPQ 467, 472 (Bd. Pat. Inter. 1968) (screening test where there was an indication of possible utility is insufficient to establish practical utility). But see Nelson v. Bowler , 206 USPQ 881, 885 (CCPA 1980) (Relevant evidence is judged as a whole for its persuasiveness in linking observed properties to suggested uses. Reasonable correlation between the two is sufficient for an actual reduction to practice.)."

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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